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JACK LAKE

COUNTY OF PETERBOROUGH

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COUNTY OF PETERBOROUGH

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Jack Lake, county of
Peterborough.

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ONTARIO WATER RESOURCES COMMISSION

ONTARIO DEPARTMENT OF HEALTH

JACK LAKE

As a result of recommendations contained in the March, 1970, report on Environmental Management of Recreational Waters in Cottage Areas in Ontario, water quality surveys of Jack Lake located in the County of Peterborough were conducted by staff of the Ontario Water Resources Commission during the periods of July 26 to 29 and September 7 to 10, 1970.

Staff of the Ontario Department of Health's Public Health Engineering Service had performed investigations of the on-shore private sewage disposal systems located in the north part of Jack Lake prior to 1970. Corrections to those systems found to be polluting are now being carried out.

The water met the OWRC bacteriological criteria for total body contact recreational use (see appendix), with the maximum geometric mean densities during both surveys being well within the OWRC criteria. The location of the sampling points as well as the bacteriological results are shown on the appended maps. It will be noted that, at many stations, a single value was used for each bacteriological indicator organism tested; this was possible since, according to the statistical evaluation performed by the OWRC's Bacteriology Branch, the bacterial densities at many of the stations were not significantly different from one another.

Dissolved oxygen, pH, and to some extent, temperature data together with chemical data revealed differing surface water

quality in the north and south half of the lake, one line of demarcation being the narrows near Rathbun Bay. Although these small differences were observed, the dissolved oxygen in the surface water was above the level designated by the OWRC for the preservation of warm water biological life and the pH was satisfactory. The concentrations of those chemical constituents showing the difference were also acceptable. The surface water was slightly hard, having concentrations from 50 ppm to 70 ppm (approximately half that of Lake Ontario waters).

Thermal stratification of the waters, a natural occurrence in many lakes, was observed during the July survey at the three locations examined (Stations 18, 32 and 36). In the September survey, stratification remained only at Stations 32 and 36. It is felt that the shallow depth at Station 18 was a major contributing factor in the disappearance of stratification somewhat earlier than at the other two stations.

The dissolved oxygen at all depths at Stations 18 and 36 was above the level designated by the OWRC for the preservation of biological life during both surveys. However, at Station 32, the dissolved oxygen in the lower part and below the thermocline (zone of rapid temperature change) was below the required level during both surveys; the oxygen depletion was probably due to a large quantity of decomposing organic matter in this area. Further studies beyond the scope of these surveys would be required to determine specifically the source of the organic matter.

BACTERIOLOGICAL INDICATOR ORGANISMS

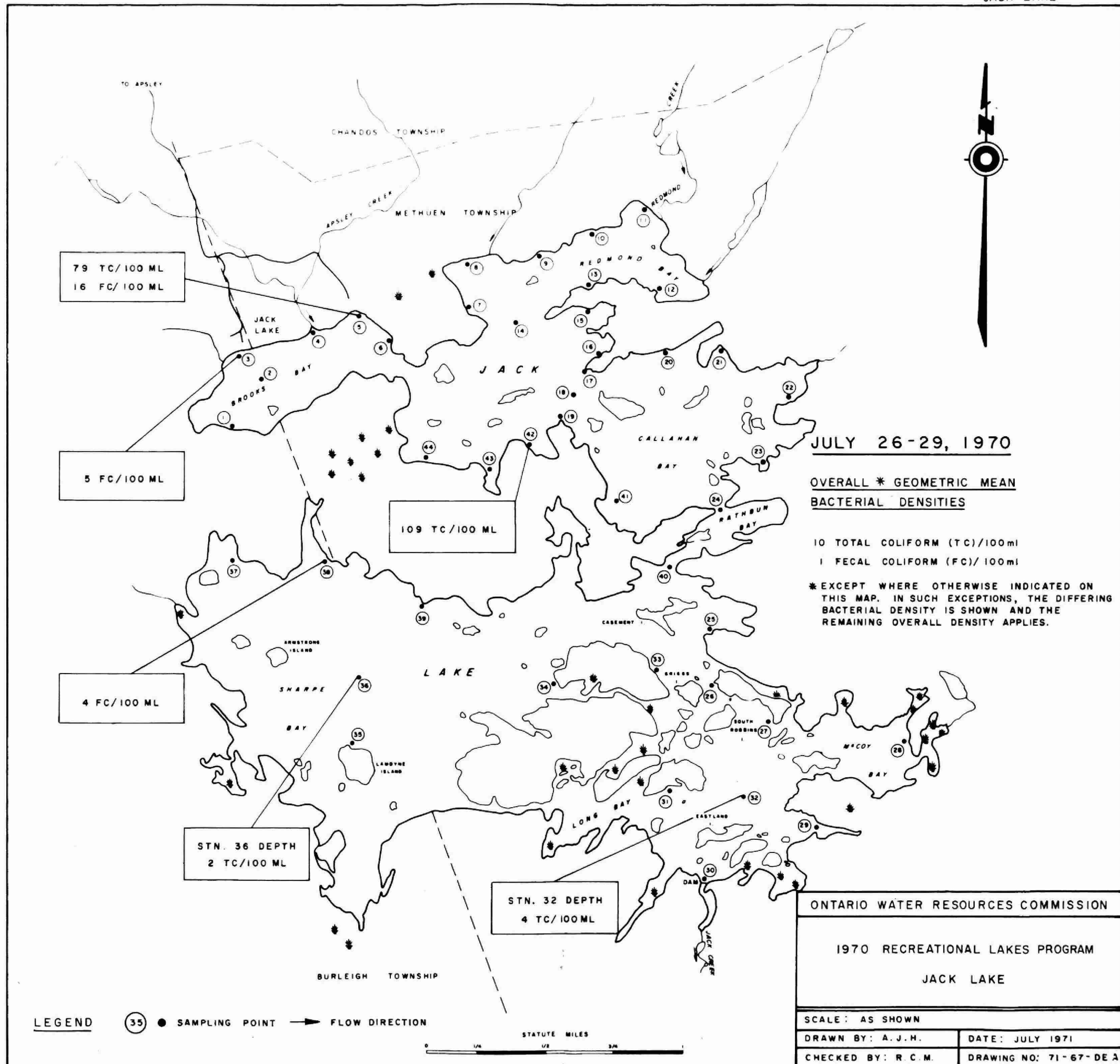
TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

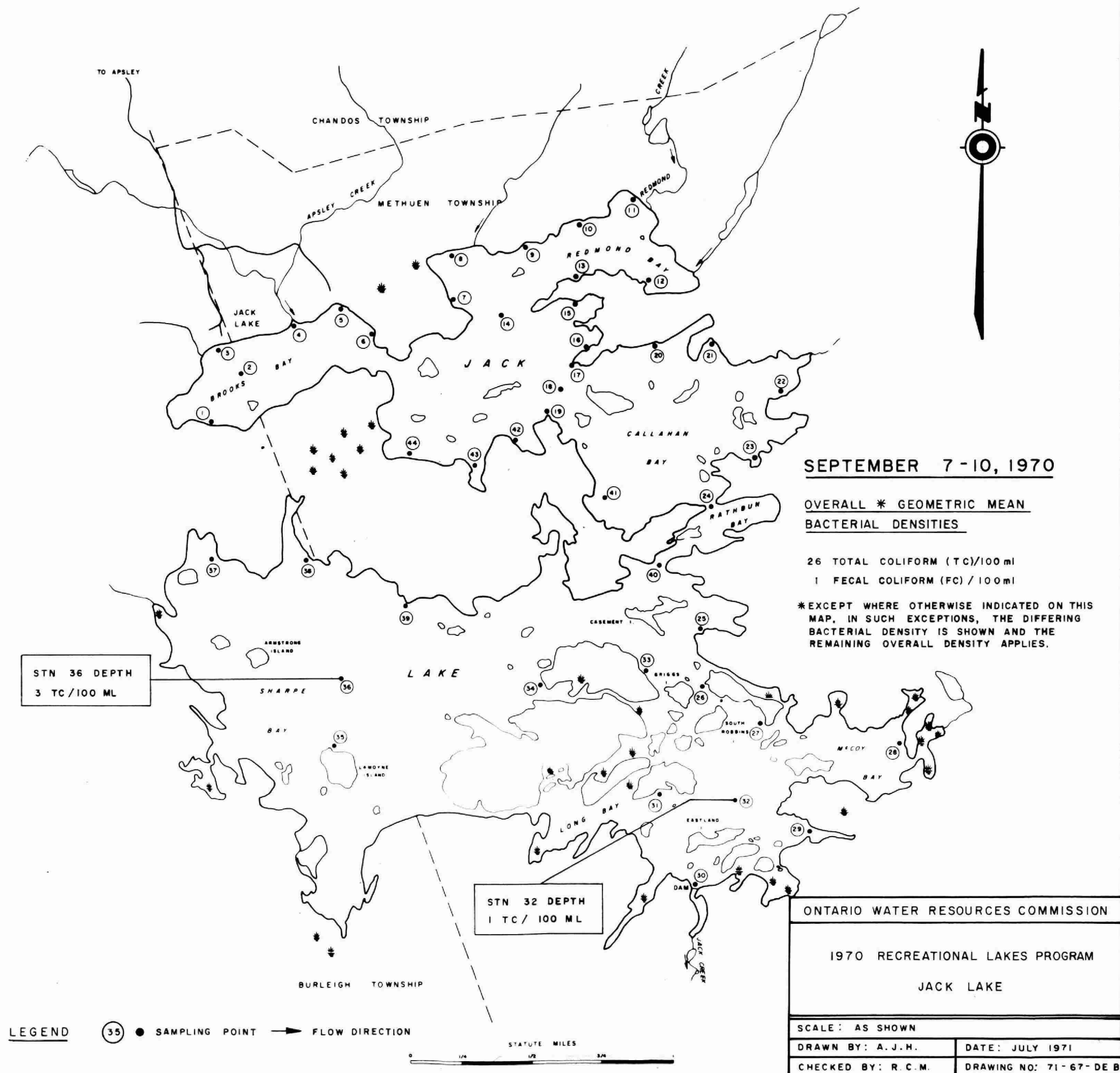
The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.





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